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THE JOURNAL OF INDIAN ART AND INDUSTRY

PRICE TWO SHILLINGS.

Vol. VII.

JULY, 1897] [No. 59.

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The Journal of Indian Art and Industry.

DYES AND DYEING IN BENGAL.

By N. N. BANERJEI, B.A., M.R.A.C., Assistant Director of Land Records and Agriculture, Bengal.

GENERAL REMARKS.

Dyeing.—The art of dyeing has long been practised in India, a country which furnishes raw materials for producing a great variety of colours; but whatever degree of perfection dyeing may have attained in past times, at the present day it does not occupy a very prominent place in the list of industries of this country. The importation of cheap European goods and European aniline dyes is proving fatal to the indigenous dyeing industry of these Provinces. This industry used to be carried on at one time on a large scale by silk and cotton-weavers, but their number has sensibly declined during the last few years, and they have been obliged to give up weaving and dyeing for other professions. European dyes, which are not as fast as indigenous dyes, appear to commend themselves to the people of this country on account of their cheapness and their brilliancy of colour. The ease with which they can be used makes them also more popular. These causes have tended to undermine the trade of the professional dyers. Whereas formerly, when a person wanted to wear a coloured cloth, he was compelled to go to the dyer, who alone knew the complicated processes by which colours could be produced from the indigenous products of this country, he now mixes up European chemical powders himself, and simply dips his cloth into a solution of the powders, when a coloured garment is ready for his use. There are other causes also which are connected with the low condition of the native industry. There appears to be a want of ingenuity in the production of colours and designs among the people of these Provinces. There is no attempt on the part of native dyers to change their crude processes, and the result is, that European cloths of various patterns and designs find a readier sale in the market. The want of capital also is a stumbling-block to improvement of any kind. Dyeing at the present day can at best be said to afford occupation only to a few who, with the aid of indigenous or foreign dyes, are capable of supplying the requirements of those who, through their social status or other circumstance, have retained their preferences for country cloth and country dyeing. In support of the views put forth above, it may be mentioned that silk-dyeing has all but died away in most of the silk districts. In Bankura, Midnapore, Rajshahi, Bogra, Bhagalpur, Malda, and even in Murshidabad, the dyeing industry, which once flourished in these places, is now in quite a moribund condition owing to the decline in the silk industry itself.

Similarly, almost every district shows a falling-off in cotton-dyeing. The *saris* made in Chandrakona and its neighbourhood in Midnapore still command a sale in the market, but being of very light material, they are not worn by decent women, although their colours are very effectively arranged. There is also a demand still for Santipur embroidered cloth made by the weavers of the Nadia district, but here also imported dyes are chiefly used. Carpet-weaving and dyeing has also declined. At one time, it used to be a flourishing industry in Rangpur, Patna, Gaya, and Muzaffarpur. At present, there are but a few families who prepare coloured threads for weaving carpets. The only place where carpet-weaving and dyeing is now carried on to any extent is the Sultanganj *mohulla* of the Patna City, where, according to Mr. Collin's Report on the Industries of Bengal, the annual outturn of coloured carpets is valued at half a lakh. The dyeing of wool is carried on only to a nominal extent now, and is mostly confined to the Bhagalpur and Patna divisions. In the Bhagalpur jail, it forms an important item of work for prisoners. Dyeing of other articles, such as wood, *sola* (pith), &c., is not confined to any particular district, but the industry is so insignificant that there is very little to add here on the subject.

Lac bangles are still made in small quantities all over the country, and lac toys are still manufactured and dyed by indigenous processes at Ilambazar in the Birbhum district; but there is no very great demand for the articles made. A good number of dyeing shops are to be seen in Calcutta, especially in the neighbourhood of Muhammadan *bustees* and houses of ill-fame, the chief shops being located in Colootollah, Machuabazar, and Colinga. The above remarks have been made with reference to plain dyeing, but they are more or less applicable also to colour-printing, which is done by a class of men known as *Chipigars*. On the whole, very little printing is now done in Bengal. There are a few up-country printers in Calcutta and in Howrah. Besides these two places, printing is now reported to be carried on to some extent in Hooghly, Rajshahi, Pabna, Gaya, Muzaffarpur, Darbhanga, and Monghyr

DISTRIBUTION of the DYEING AND PRINTING INDUSTRY OVER THESE PROVINCES.

Owing to the fragmentary nature of the information contained in district reports regarding the classes who carry on the dyeing industry, it has not been found possible to give any accurate totals for the Province in this monograph. The following, which has been taken from the Census Report of 1891, shows the number of cotton dyers in each division of these Provinces:—Burdwan, 399; Presidency, 480; Rajshahi, 49; Dacca, 10; Chittagong, 58; Patna, 18284; Bhagalpur, 1,106; Orissa, 28; Chota Nagpur, 372. The total number (20,786) includes both males and females, but it must be remembered that, with some exceptions, adult males alone engage in dyeing.

The above does not give a full survey of the total number of dyers in these Provinces, as, besides cotton-dyeing, there exists the silk-dyeing industry, and the dyeing of other materials besides cloth, such as wood, *sola* (pith), &c. In many districts, also, the work of dyeing forms but an incidental portion of the work of weavers

and other castes, and any estimate of the number of dyers should take this fact into consideration. The Census Report is also silent as to the numerical strength of each caste engaged in dyeing, and it, moreover, at best gives a picture of the dyeing industry as it stood six years ago. Since then, owing to the every-day increasing use of aniline dyes, the native industry has gradually declined.

Some idea of the relative importance of the dyeing industry in the different districts of these Provinces at the present day may be gathered from the following information extracted from the reports of District Officers. The chief centres of the industry in different districts are stated where known. The information of District Officers has been supplemented with information obtained personally by the writer.

Dyeing is carried on on a small scale in the villages of the Sadar subdivision of Burdwan. In the Sadar town itself, there are only three or four shops with about a dozen workmen. In the Raniganj and Kalna subdivisions, it is reported that dyes are not manufactured, and that no dyeing processes are carried on. In Katwa, lac dye was once largely manufactured and used for dyeing in Dignagar and Hatkirtinagar, but it is now found profitable to prepare shellac in these places. Conch-shell ornaments and *tasar* cloth are also dyed in Katwa. The numbers who engage in this work are very limited. Altogether, the dyeing industry in the district is said to be in a moribund condition. Only a few dyers exist at the present day, who are scattered over different parts of the district.

No dyeing is carried on in the Birbhum district. Indigo is prepared in nominal quantities in two small factories, and lac is obtained all over the district in small quantities, and used for the manufacture of bracelets and other ornaments.

The dyeing industry is for the most part confined to the cotton and silk-weavers of the Bankura district. They were at one time numerous, but owing to the importation of European piece-goods and aniline dyes, many of them have taken to menial labour, and there are at present reported to be only about 500 or 600 families of weavers at Vishnupur and Sonamuki, and about 200 to 300 families in Bankura town and in the villages of Rajgram and Birsingpur, who, too, are said to have almost given up dyeing cotton and silk with indigenous dyes.

The report from Midnapore states, that here and there dyes are occasionally made, but that the manufacture nowhere amounts to an industry, although several plants and trees grow in the district, from which dyes can be obtained. Dyeing was most probably extensively carried on when the silk industry flourished.

Dyes are manufactured and used in the Hooghly district on a limited scale. The indigenous substances from which they are prepared are not produced in the district, but brought from the neighbouring districts of Bankura and Midnapore and from Calcutta. There are about 400 to 500 Laharis (*i.e.*, lac dealers) in the district, who chiefly reside in the Sadar and Jahanabad subdivisions. There are also about 700 to 800 weavers scattered over the district, who engage in dyeing silk and cotton. Besides this, there are three firms in Serampore, where silk handkerchiefs and cloths of good repute are dyed and sent to Calcutta, whence they are despatched to Bombay, Rangoon, Madras, and England. Colour printing is done in these shops. In Howrah, there are about 25 dyers scattered over the town, and a few families of printers.

Beyond four or five families who prepare a red dye on the occasion of the Holi festival, it is reported that there is no class of people who carry on dyeing in the 24 Parganas. The process of dyeing by indigenous methods is confined only to a few people in the Nadia district. Weavers in Santipur and Kushtia use imported dyes.

There are about nine families of silk dyers in Murshidabad, whose centres of business are at Khagra, Baluchar, and Mirzapur. These men are weavers by caste. Each dyer employs about six or seven workmen under him. Besides these there are three families of Muhammadans, who also dye cotton cloths, especially quilts, which are exported to Calcutta, Dacca, and other places, and two families of toy makers, who dye wooden wares.

It is reported, that no dyes are manufactured and that no system of dyeing is carried on in Jessore and Khulna on any scale. There are only four persons in Rajshahi who print cotton cloths, and six who dye them, whose shops are all in the Sadar town. About 30 carpenters dye wooden articles in the Putia, Nator, and Boalia thanas, and about 506 Muchis and half that number of Chamars dye leather throughout the district. About 800 persons of the Malakar and Bairagi castes are reported to dye pith articles chiefly in the towns of Rampur, Boalia and Putia, and about 18 families of Doms are reported to dye bamboo and cane wares. The Kumars of the district, who numbered 7,945 according to the Census of 1891, all dye their earthen pots.

No indigenous dyeing industry is reported to exist in Dinajpur. In Jalpaiguri, no particular class carry on dyeing. The Tantis, Muhammadans, and Meches of the district dye the *endi* thread for their own use chiefly, and rarely only for sale. No information is forthcoming as to the number of dyers in Darjeeling. It would appear, however, that dyeing is a very unimportant industry of the district. Nine persons in the village of Nesbitganj, three miles to the west of Rangpur town, are reported to dye thread for weaving carpets, and about 500 persons scattered about in various villages are said to be engaged in dyeing *endi* cloth.

Dyeing is carried on to a small extent by the silk and cloth-weavers of the Bogra district. Of the former, there are said to be at present only about half a dozen skilful workers. The number of the latter is estimated at 200. There are about 16 shops of dyers in the Pabna district. The total number of men engaged in dyeing is estimated at 200 to 300. The centre of the industry is at Pabna town, where there are 11 shops.

In Cox's Bazar subdivision, in the Chittagong district, dyeing is carried on among the Mughs who live in that subdivision. In Cox's Bazar Municipality itself, there are about 180 houses of Mughs, whose productions are noted for the brightness and fastness of their colour. The chief centre of the industry is in a village called Tekpara. In this village, indigo is also used for dyeing by Mussalman women in 10 or 11 houses; in Ramu and Harbhang the wives and widows of labourers and traders dye to a small extent. There are about 40 families of weavers in Pahartali village who also dye. In Chittagong town itself, there are only about two or three houses of dyers. Printing is done by a few boys.

At Patna, the number of cotton dyers in the Sadar town is estimated at 100, and that in the rest of the district at 100 also. About 500 men are said to be engaged in stamping cloths in different fancy colours. Besides these,

there are about 500 families of weavers in Futwa in the Barh subdivision who dye their own cotton and silk threads before weaving. There are also a number of weavers who dye raw cotton and thread for the purpose of preparing *daris* (carpets). It is estimated that there are 143 dyers at the Sadar subdivision of Gaya, 38 in Nawada, 46 in Jahanabad, and 65 in Aurangabad; altogether 292 in number. Some of these are really *chapgars* or stampers, whose real business is to stamp shades of various colours on cloths already dyed. At Shahabad, the number of persons actually engaged in the dyeing industry is comparatively small. The centres of the higher forms of the industry are Sasaram for dyeing earthenware or plates, and Arrah for dyeing wood and cloth.

There are about 300 dyers in the district of Saran. The chief centres of the industry are the towns of Chapra and Siwan. The number of cloth and thread dyers in the Champaran district is about 900, including females. They are scattered throughout the district, but principally carry on the trade in the towns of Bettiah and Motihari. Threads are dyed also for making carpets by carpet weavers, whose number is about 250, inclusive of females. There are 30 to 35 dyers in the town of Muzaffarpur, and 5 to 7 in that of Hajipur, while every other important village in the district has its own dyers. In Muzaffarpur, calico printing is also carried on. In Darbhanga, the number of dyers is not considerable. They may be broadly divided into two classes, viz. (1) the general dyers, and (2) the printers.

Dyeing is now a limited industry in Monghyr, the dyers of the district numbering only about 150. Besides the dyers, there are about 40 or 50 calico printers in the district, the chief centre of whose industry is the town of Shaikpura. Formerly, when *tasar* silk-weaving flourished in Bhagalpur, dyeing gave employment to a large number of persons; now it is carried on only to a very limited extent in the district.

There are about a dozen families of professional dyers in the Malda district. Besides this, there are a few families of silk-weavers who colour their own silk. Dyeing among the Sonthals is purely a village industry carried on here and there in the district. Besides them, the Jogis manufacture rude dyes. According to the last census, they number 1,500 males and females. It is only in the outlying portions of the Cuttack district that dyeing is practised to any extent. In all the principal centres, the cheaper and brighter tinted yarn from Europe has superseded the local industry. Dyeing is reported to be carried on in 20 families in each of the 52 villages of Talda thana; and in Barabazar, it is estimated that there are about 1,000 cultivators who take more or less to dyeing. The silk-weavers of the district also dye to some extent.

From the above, it will appear that the chief centre of the dyeing industry is Bihar. The Patna division of Bihar, and especially the district of Patna, has the largest number of dyeing shops. In Central Bengal, though the industry has declined, indigenous modes of dyeing are still practised to some extent. Dyeing appears to be virtually extinct in Northern and Eastern Bengal and in Orissa. In Chota Nagpur it is carried on only to a small extent. Silk-dyeing still prevails in Murshidabad, and to a limited extent in Bankura, Bogra, and Malda. It has all but died out in other silk districts, such as Midnapore, Rajshahi, and Bhagalpur. Printing is chiefly carried on in the Patna division of Bihar. Dyeing and printing is also carried on in Calcutta, but aniline dyes are almost universally used here, the indigenous dyes being employed only when specially ordered.

DYERS AND PRINTERS, THEIR SOCIAL AND PROFESSIONAL STATUS.

The Muhammadans are the principal dyers of these Provinces. Among the Hindus, the Tantis are the principal dyers. The other classes who once engaged or now engage in dyeing are reported to be Kumars (potters), Kamars (carpenters), Sadgopes, Sarnobarniks, Bairagis, Rajbanghis, Jogis, Rishis, Muchis, Chamars, Kandus, Dhobis, Tatwas, Malis, Paurs (weavers), Patras, Sonthals, Kols, Kurmis, Bhumijes, Baidyas, Chatrars, Doms, Mughs and Meches.

Dyers go under different designations according to the districts in which they carry on their work, and according to the branch of the industry in which they engage. In Bihar, those who dye cloths are called *rangrezes;* those who dye silks *patuns,* and the lac-dyers are known as *laheras.* In Lower Bengal, lac-dyers are styled *laharas,* and in Orissa the silk-dyers are known as *patras.* In Shahabad, those who dye wooden plates and boxes are styled *kamangars;* those who dye and enamel woodwork, *barahais;* and those who paint *tikulis* (worn by village women on their foreheads), *nuniars.* Those who dye wood are also called *rangsazes* in Bihar. In Murshidabad, the dyers of wooden toys are known as *kharadis.* Those who dye conch-shell ornaments are called *shankaris,* and those who paint *churis* are known as *nuris.* Those who paint *sola* (pith) toys and idols are called *malakars;* calico and silk printers are styled *chapgars* or *chipigars.*

Generally, professional dyeing is done by males. Women may also dye, but they do so as a rule for their own use at their houses, and do not work in shops. In Chittagong, however, Mugh and Musalman women are reported to carry on dyeing. Boys may be found sometimes working as apprentices in the shops of their relatives.

It may be interesting here to remark, that outside professional dyeing both males and females use dyes on different occasions for colouring. It is a general practice with the poorer class of Brahmans of Bengal to dye the clothes of their sons during the ceremony of donning the sacred thread (*poita*). The well-to-do Brahmans who can afford to buy coloured silken cloths (*chelis*) do not take this trouble. At the time of the *Charakpuja* in Bengal, the Hindus who do penance, whether men or women, always dye the coloured clothes they then wear with their own hands. These include all classes of Hindus, except Brahmans. Women of all classes, both Hindus and Muhammadans, decorate their feet and the palms of their hands with a red colour obtained from lac. Married women paint their foreheads at the parting of their hair with an indigenous vermillion dye. Women of all classes, especially Muhammadan women, obtain a red dye from the *mehndi* (*Lawsonia Alba*) with which they colour their fingers, nails, hands and feet. *Mehndi* is also used for dyeing the beard or hair among the Muhammadans. Turmeric dye is rubbed over the body by all classes, and the *abir* is used by the Hindus at the time of the *Holi* festival.

The Muhammadans are the principal dyers and printers in Bihar. They are also to be found in other districts in Bengal. As a rule, they belong to the Sheikh sect. Contradictory reports have been received with

regard to their social standing. While from some districts it is reported that dyeing is not considered derogatory, and that the Muhammadans who practise this art are not looked down upon by their fellow-countrymen, from other districts it is reported that the Muhammadan dyers occupy a low social standing among their brethren. My personal enquiries in this matter incline to the former view. Though a Sheikh of some other profession would not intermarry with a Sheikh dyer, it is not to be inferred that the latter is of lower social rank. The dyers have their own restrictions as to marriage, but in other respects they mix freely and equally with all Sheikhs. The Muhammadans for the most part engage in dyeing cotton, silk, cloth or thread. In Rajshahi, a few families dye articles made of *sola* (pith); and in Shahabad, in addition to cloth, they dye wood and deal also in lac-dyes.

The Tantis belong to the weaver caste. They are to be found in almost every district of Bengal, where, to their own profession, they sometimes add the work of dyeing. They are generally very poor, and belong to a low order of Hindu society. Their work is chiefly confined to dyeing cloths and threads.

The Kumars belong to the potter caste, and occupy a place below the Kayasths. They are not professional dyers, but simply colour the earthen pots manufactured by them. Men and women both engage in this work. Some few families in Rajshahi are said to paint toys and idols with native colours.

The Kamars are of the carpenter caste, and although dyeing does not come within their regular profession, some of them do dye their wooden wares. In Shahabad, these Kamars, or Barahais as they are sometimes called, dye and enamel wood-work.

The Satgopes and Surnobarniks are reported to have at one time carried on the manufacture of lac-dye in Burdwan. The Bairagis profess a religious life, occupying a low social position among the Hindus. They are not allowed to eat with higher castes. In Rajshahi, they are found painting toys made of *sola* (pith), and in this work men and women alike take part.

There is a limited number of Rajbangshis in Rangpur, who are said to dye *endi* thread and *endi* cloth for home use and for their neighbours, and not generally for sale. There are a few Jogis also in Rangpur who dye cloth, like the Rajbangshis. In the Sonthal Parganas, also, Jogis carry on the dyeing industry. These men do not depend entirely on dyeing for their livelihood. They are cultivators, and in times of scarcity take to begging. Rishis are low-caste Hindu butchers, who are said to dye leather in Faridpur. Their number is very limited. Muchis and Chamars also carry on this work. They are of a very low caste, just a little above the Doms in social position. Leather is dyed in Faridpur and other places by low-class Muhammadans also.

Kandus, Dhobis, Tatwas and Malis are said to dye with the *al* dye in Patna. Dhobis are generally calico printers. The Paurs in Lohardaga (corresponding to the Tantis of Lower Bengal) dye their own yarn before weaving cloth. Like the Tantis, they hold a low place in Hindu society. Patras are the silk-dyers of Orissa. Sonthals are reported to engage in dyeing in Bhagalpur, Sonthal Parganas, and Manbhum. They chiefly engage in dyeing cloth and yarn. In Manbhum, only Kols, Kurmis, Baidyas, and Chatrars are reported to carry on dyeing operations.

Domes belong to the lowest caste of Hindus, whose touch is pollution to other Hindus. They generally dye articles made of split bamboo or cane. Mughs are reported to carry on their dyeing work in two districts, viz., Backergunge and Chittagong. They appear to be of Arakanese origin, and make good dyers. In Chittagong, it is reported that dyeing forms part of almost every young Mugh woman's education. They are well noted for dyeing bright colours in the pattern of plaids on silk and cotton cloths. Meches belong to an aboriginal race. They are mentioned in the reports from Jalpaiguri as a class who dye their own cloths. Besides the above, a few Kahars, Telis, Marwaris and Kayasths also engage in dyeing.

Dyers as a class are very poor. They dye for local use only. Their ordinary earnings do not exceed Rs 8 per month, and in order to maintain their families they have to take service and ply various trades, carrying on dyeing only as a part of their work. Some have their own lands to cultivate, and as a rule these are in better circumstances. The poorest class of dyers do not earn more than Rs.3 to Rs.5 per month, but there are others also who earn as much as Rs.12 to Rs.15 per month. Owing to the greater demand for their work, dyers in Calcutta, as a rule, are better off than their brethren in the interior. Exceptional cases may be found of rich dyers in the mufassal, who have a large number of subordinates working under them, and who get more than the earnings quoted above; *e.g.*, in Patna there are some dyers who earn as much as Rs.50 per month; in Gaya one rich dyer is said to earn an income of about Rs.900 a year, and two or three others earn about Rs.300 to Rs.500 a year. All these remarks apply to cotton dyers. The poorest class among the dyers, if they be so considered, are the Doms, who colour baskets and other bamboo articles. Their earnings do not exceed Rs.3 to Rs.5 per month. The Chamars, who dye leather, are better off, earning from about Rs.7 to Rs.15 per mensem. Potters, who dye their earthen pots, are generally well off, owing to the great demand for such vessels among all classes of Hindus. Dyeing carpenters (or *Rangsazes*) also are, as a rule, in good circumstances, and earn from Rs.10 to Rs.20 per mensem. Silk-dyers, as a class, are in better circumstances than those who dye cotton. Their ordinary earnings vary from Rs.10 to Rs.12 per month. Rich silk-dyers are to be met with, who employ subordinate workmen to carry on their work. There are said to be about nine families of such dyers in Murshidabad, whose net profits average about Rs.500 a year. The business of silk-dyers depends generally upon the conditions of the silk trade of the districts in which they have their shops.

Like dyers, calico printers do not ordinarily earn more than Rs.6 to Rs.8 per month. At the Serampore printing shops, the proprietors are said to earn from Rs.20 to Rs.25 per mensem. The experts employed by them earn from Rs.10 to Rs.15 a month, and the boys under the pressman get Rs.5 per month. In Calcutta, the ordinary earnings of a printer amount to about Rs.15 per month.

DYE-STUFFS AND PROCESSES EMPLOYED IN DYEING.

Principal Dye-Stuffs.—The substances used in dyeing and printing include the fruits, flowers, leaves, roots, seed, bark, wood and galls of plants, and also insects and earths.

E. 13601

The chief indigenous products of these Provinces yielding dye-stuffs and now used by dyers are:—Indigo (*Indigofera tinctoria*), turmeric (*Curcuma longa*), lac, *kusum* (*Carthamus tinctorius*), *bakam* (*Cæsalpinia Sappan*), *singhar* (*Nyctanthes Arbortristis*), *kamala* (*Mallotus Philippinensis*), *palas* (*Butea frondosa*), *latkan* (*Bixa orellana*), and *al* (*Morinda tinctoria*). All the above generally yield principal dyes, but they are also sometimes used as auxiliaries. Keeping in view the instructions of the Government of India, that products and materials are to be discussed in this report, only in so far as they are needful for the purpose of giving a survey of the indigenous industry, a short description is added only of the more important dyes mentioned above, and the ordinary processes employed in extracting and using them.

Indigo is used very largely for dyeing, but the dye is generally manufactured by European processes, of which so much is already known that no elaborate description is necessary in this report. Suffice it to say, that the indigo manufactured by the European process is not a permanent dye, and it is therefore sometimes mixed by native dyers with some other ingredients, *e.g.*, shell-lime, *sajimati*, treacle, and the pounded roots of the *auch* or *al* tree (*Morinda tinctoria*), as reported from Faridpur, in order to make the colour permanent. Indigo, however, is prepared on the indigenous process by native dyers in Chittagong, and is said to be cheaper than imported dyes. Moreover, it is not found necessary to use lime with it in colouring, probably due to the fact that lime is used in its manufacture. No description is given in the district reports received of the indigenous method of preparing the indigo dye; but the following accounts, extracted from Dr. McCann's Report on the Dyes of Bengal, may prove interesting.

He states that in Chittagong, "the plants on being gathered are allowed to rot in water and then removed. The water is then mixed with lime, and the liquid allowed to stand for about 12 hours. At the end of this time, a deposit is found at the bottom of the vessel, which is dried and kept in the form of cakes." "In Palamau," he says, "the plants are soaked in a large open earthen vessel. The water is beaten up, and then put on the fire in small vessels to boil. When this has been done sufficiently, the dye is strained through country-cloth."

Lac is found as an incrustation on the branches of various trees, being formed by an insect known as the *Coccus Lacca*. The trees on which it is chiefly found are the *pipal* or *aswat* (*Ficus religiosa*), the plum tree (*Zizyphus Jujuba*), the *palas* (*Butea frondosa*), and the *kusum* tree (*Schleichera Trijuga*). The best lac is said to be produced on the last two trees. It is reported to be produced in Birbhum, Bankura, Midnapore, Murshidabad, Manbhum, and Singhbhum, but its manufacture does not appear to be carried on now at Bankura and Birbhum. Lac is found mostly on trees growing wild. Very few trees are now specially cultivated for its production. In Murshidabad, however, a large tract of land, lying on the right bank of the river Bhagirathi, known as the *rarh* tract of the district, is laid out with lac-producing plum trees. Each tree is said to yield from 10 to 20 seers of lac. The cost of production varies from one rupee to two rupees per tree, or Rs. 80 to Rs. 160 per bigha, which contains about 80 plum trees. The trade in lac is now very limited. The only districts from which it appears to be exported are Bankura, Murshidabad, and Manbhum. The incrustation in its natural state is known as stick-lac. This is taken off the trees in March and October by pounding, so that the resin is separated from the twigs. The resin is then ground into a fine powder, and well rubbed in cold water for some time. To promote the separation of the dye from the resin, water is added at intervals, and an alkali (*sajimati*) is sometimes mixed with the resinous powder under water. The liquid is then strained through a coarse cloth; the resin is left behind, and is utilized for the purpose of making shellac. The liquid strained is allowed to settle in a vessel for some time, until a thick sediment forms at the bottom. A little lime-water is added to help the precipitation of the sediment. This sediment is then pressed into cakes, and forms the lac-dye of commerce. From this is prepared another article which is used as a cosmetic, called *alta*. The first step taken by the *alta* makers is to pound the lac into a coarse powder. This powder is then placed in a large earthen vessel, which is usually made with a rough inner surface. Some water is then added, and the whole is stirred vigorously with a thick stick. Water is added a second time, and the liquid is heated and left to simmer for some time with a little alum added to it. After this, the contents are allowed to cool and are then strained. The liquid thus strained off is of a rich crimson colour. Then some cotton is taken and soaked in a kind of starch made from pulse, and beaten out into a thin circular slab. These slabs or pieces are then placed in the crimson liquid and allowed to become thoroughly saturated, when they are taken out and dried, and are then ready for sale. Eight to twelve such pieces may be had for a pice.

Lac is used for the manufacture of toys, of bracelets, and other ornaments by Laharis. Country lamps, which are so largely used by the natives, generally have a crimson band round the chimney, which is produced from lac. Lac is further used by toy-makers (*kharadis*) for the purpose of coating their wooden wares. Earthen toys and idols are also coated with lac. Weavers use it for dyeing silk, and especially *tasar* silk materials.

Like indigo, turmeric is extensively employed in dyeing cotton clothes, especially at weddings and on other festive occasions. In many districts, householders will be found dyeing their bathing napkins in turmeric. In Orissa, almost every householder dyes the clothes of his children or of the females of the house with this material. It is used also for dyeing toys and other articles of *sola* (pith). Turmeric yields a colour of a fleeting character only, and is used generally as an auxiliary to other dye-stuffs. It is also rubbed on the body in order to give a yellow flush to the skin. The process by which the dye is extracted is very simple. The dry root or rhizome is soaked in water, and then pounded and placed on a piece of coarse cloth. Water is then added and strained through the cloth. From Muzaffarpur, it is reported that one seer of turmeric with two seers of water gives the necessary infusion. In upper circles of Indian society, saffron is generally used instead of turmeric in dyeing clothes yellow.

Safflower is much appreciated on account of the many simple and compound colours that it produces. In itself, it contains two pigment principles, viz., safflower yellow and safflower red. It is largely used all over these Provinces, and especially in Bihar; and in spite of the introduction of aniline dyes, it has not been driven out of the market. Indeed, in Bihar, it is regarded as particularly sacred by the Hindus—a fact which is exemplified by

the current Bihari aphorism, "*Bap rahal pet me, put gal bariyat*" (*i.e.*, "When the father is in the womb, the son goes to the wedding party.") The father is the seed, and the son is the dye. The red colour of safflower, being considered as an emblem of holiness and success by orthodox Hindus, is much used for wedding apparels. The Dacca safflower is the best in India. Desides being used for dyeing cloth of cotton or silk, safflower is also used for colouring toys, &c., made of *sola* (pith).

The methods of extracting the dye employed in the various districts of these Provinces are in all essentials similar. It will suffice, therefore, to add the following description of the method employed at Muzaffarpur, which is supported by what the writer has himself observed:—"The florets, after collection, are placed in a basket and dried in the shade. Exposure to the sun weakens the dye. When the florets are sufficiently dry, they are deposited in an earthen jar. About ¼ lb. of these florets are mixed with about two seers of cold water, after being ground to a coarse powder. The powder is then washed by being rubbed with the hand, and then it is agitated briskly for about 15 minutes or so. The water, which is of a dirty yellow colour, is then decanted. Fresh cold water is again added, and the whole mixture put into a piece of cloth hung on a wooden filter frame. The water is allowed to filter down gradually. This process may be repeated several times until the yellow tint is almost removed. The yellow water thus obtained, known as *pewar* in Bihar, is sometimes thrown away, and sometimes kept for preparing more complicated dyes. When the yellow principle is thus eliminated, some alkaline substance is added to the flowers in order to dissolve the red colouring matter. One-and-a-quarter *tolas* of *sajimati* suffice for the purpose. The mixture is then well pounded together. This is done either by rubbing with the hand or treading with the feet. To the above compound is then added 1½ lbs. of cold water, and when the alkali has been sufficiently mixed with the flowers, the water is allowed to strain through. The resulting solution is now of a red colour." A little lime-juice is sometimes added to neutralize the effects of *sajimati*. Wood ashes, and ashes of burnt plantain rinds, and pods of palm flowers are in some cases substituted for *sajimati*. Sometimes, again, tamarind, mango, or curdled milk is used instead of lime-juice.

The *bakam* plant, from the wood of which is obtained a red dye, is said to grow abundantly in Cuttack. In Faridpur, the *bakam* dye was at one time largely used, but has been superseded now by majenta and other aniline dyes. The bark of the plant is used for producing an orange-yellow-coloured dye in Muzaffarpur. The wood is never used here for dyeing purposes, The oldest and biggest trees are said to yield the best dyes. The bark is also used in Chittagong for getting a *pucka* or fast red colour. Besides being used for cloth, *bakam* is also used for the preparation of *abir*, a red powder which is used during the Holi or Doljatra festival.

The mode of preparing it is thus described in the report received from the 24 Parganas:—"The roots of the *soonti* plant are dried and then powdered, and then mixed with the extract obtained from *bakam* wood." From Cuttack it is reported that *abir* is made by pounding the roots of the *palua* (*Banhuldi—Curcuma Zedoaria*) fine, and then steeping the powder in an infusion of *bakam* wood. The powder is then dried and again steeped, and the process repeated until the desired shade is obtained. The powder is then well dried, and is ready for sale. It is stated in the Cuttack report, that imported English dyes have taken the place of *bakam*, even in the manufacture of *abir*. The *bakam* dye itself is extracted simply by cutting up the wood in small pieces, or pounding it into a powder, and then boiling it for five to eight hours. The proportion of wood to water, as stated in the Monghyr report, is 4 chitaks *bakam* to 4 seers of water.

The trees which bear the *singhar* flower are not generally planted. They are found growing wild in gardens and homesteads almost in all districts of these Provinces, and are reported to grow to perfection in the hilly jungle lands of thana Sherghati in the district of Gaya. This flower is also known by the following names:—*Seoli*, *sephalika*, *harasinghar*. The process of extraction of the dye is very simple. The white petals of the flowers are cast off, and the orange-coloured corolla tubes are well dried in the sun. They are then boiled or immersed in hot water until the colour is extracted. The infusion is an orange colour, which is very fleeting. *Singhar* is used generally as an auxiliary to other dyes. It is also used for dyeing liquor.

The *palas* tree, like the above, is not especially cultivated for its dye. It is found growing wild in gardens and jungles. The dye is extracted simply by boiling or steeping the flowers in hot water. It is used for dyeing cotton and *sola* articles.

The *latkan* tree, like the *palas* and *singhar*, is to be found growing wild in jungles and gardens, and does not appear to be cultivated for its dye. It is known also as *bilati-haldi*. The seeds are used for the preparation of the dye. A deep yellow and red colour is obtained from the pulp which surrounds the seed. Though fleeting, it is said to last longer than the colour obtained from safflower. By certain combinations, different depths of yellow colours are obtained. It is used for dyeing both silk and cotton. The dye itself is obtained by pounding and boiling the seeds in water mixed with soda and alum. The following process is described in the report received from Hooghly:—"In three seers of hot water one seer of *latkan* seeds are well thrashed and rubbed. When the water becomes red, and when very little remains of the seeds, the water is placed upon a hearth and heated. The seeds are then thrown away. The red water having subsided to 2½ seers, 1½ tolas of alum are poured into it. After two or three minutes, the red water is brought down. Thus is the colour produced."

The *kamala* plant is also found growing wild. The dye is obtained in the form of a powder from the epidermal glands which cover the fruit. The dye is extracted by drying the fruit in the sun, and then beating out the powder. The colour of the powder is red, but it dyes cloth yellow.

The different names by which the *al* plant is commonly known are *al*, *ach*, *aich*, *achu*, *aush* and *daruharidra*. It is reported to be extensively cultivated in the Hajipur subdivision of Muzaffarpur, where a superstition exists that whoever raises the first crop must know that his days are numbered. The old are generally therefore chosen for the purpose. The plants are allowed to grow for at least three years, and to attain a height of about seven feet before their roots are capable of yielding the dye. The finer roots are generally preferred to the thicker ones. The dye obtained from this plant is used in plain dyeing, and is one of the principal colours also in stamping cloths. It is obtained by cutting the roots in small pieces, and then pounding them well until they are converted into a powder, after which the powder is steeped in water.

ORDINARY PROCESSES EMPLOYED IN DYEING CLOTH AND THREAD WITH THE MORE IMPORTANT DYES.—The processes followed by native dyers in dyeing cloth with indigo are so well known, that nothing but a short notice of them need be given here. The ordinary method of dyeing with indigo, as observed by the writer, was as follows:—Indigo is diluted in water and then mixed with *sajimati* (Fuller's earth) water. A little more *sajimati* powder is then added to this mixture, as also lime and molasses. The solution is stirred from time to time for three or four days. The cloth to be coloured is then dipped into the solution and allowed to dry. This is repeated until the required colour is obtained, the depth of colour depending on the number of times the cloth is dipped into the fermented infusion, —*e.g.*, the *abi* (light blue) colour is produced by a very light immersion; the *asmani* (or sky-blue colour) is produced generally by one or two dippings; whereas the *nil* (indigo blue) and *surmai* (blue-black) colours are produced by four or five dippings. The proportions of the substances used are given in the report from Monghyr, and are as follows:—Indigo, 4 chitaks; *sajimati*, 1 seer 12 chitaks; lime, 8 chitaks; molasses and water, 2 chitaks. The indigo bath is strengthened often with other substances than those mentioned in the formula given above,—*e.g.*, with plantain ashes, with wood of the *Morinda tinctoria*, with *chakunda* seeds (*Cassia tora*), &c.

Indigo, in combination with other dyeing stuffs, gives black, purple, maroon, and green colours of different shades. In Chittagong, where the process is different from that commonly in vogue, indigo is taken and mixed with boiled *echi* seeds. Ashes of the *gatia* and other saline shrubs are mixed with cold water. The water is strained through a cloth into the jar containing the mixture of indigo and *echi* seeds until the jar is full. The whole is then stirred up with a stick at intervals, and in from two to six days it becomes a deep black. The cloth to be dyed is soaked in water, and left out in the sun for a short time. It is then dipped in the liquid and again put out in the sun to dry. This immersion and drying in the sun is repeated four or five times until the colour is sufficiently fast.

The mode of dyeing with lac is given in detail in the reports from Burdwan, Cuttack, Manbhum and Singhbhum, and is reproduced here:—

Burdwan.—"Cakes of dye are rubbed with a small quantity of water in a vessel. A large quantity of water is then added to dissolve the lac, and *sajimati* (an alkali) is then put in. The whole is then well mixed, and the mixture strained. The strained-off liquid is boiled, and to it is added some *lodh* (*Symplocos racemosa*) powder, when the liquid is strained a second time. The cloth to be dyed is then steeped in this liquid, boiled and then dried. By these means a permanent red colour is obtained."

Cuttack.—"Stick-lac is rubbed in an alkaline solution obtained by soaking the ashes of plantain leaf in water, and mixed with *lodh*, turmeric and alum. This preparation is then placed over a fire and allowed to boil. The cloth (silk) to be dyed is also soaked in alum and turmeric water, and placed in the sun to dry. When the above preparation is boiled down to about three-fourths of its quantity, it is mixed with a solution of tamarind, and the silk, when dry, is dipped into this boiling solution, where it is allowed to remain about a quarter of an hour, and then taken out and washed.

Manbhum.—The process is similar to that followed in Cuttack.

Singhbhum.—In Singhbhum, alum only is added to lac water, after which the mixture is boiled, and the substance to be dyed is then inserted into the boiling mixture, where it is coloured red.

Lac-dye is used in combination with other substances to produce a red dye, which is commonly used for colouring earthen toys and idols. The colouring is fixed by tamarind seed or *garjan* oil mordant. After the dye has dried, turpentine oil is put on to give the toys a glaze.

Turmeric by itself yields a dye of a fleeting character. Other ingredients, such as alum, are therefore added to it to produce a more lasting colour. A mixture of turmeric, *sajimati*, and lemon produces a brilliant yellow colour. The processes described in the district report from Monghyr, which are similar to those in vogue in other districts of these Provinces, are as follows:—

(*i*) Turmeric is finely powdered and put into water. The cloth is first dipped in the water, and it is then lightly washed in pure water, and then dipped in acidulated water, prepared from alum or lemon, when it is coloured a brilliant yellow. One chitak of turmeric will yield a deep yellow colour to a yard of fine cloth.

(*ii*) Turmeric is mixed with a solution of *singhar* flowers, and then a little alum is added. The cloth is dipped into the solution while hot, and is dyed deep yellow (*basanti*).

The liquid dye extracted by boiling *bakam* wood is of a red colour. To this, alum is added as a mordant, and the cloth to be dyed is dipped in this mixture. *Kakreja*, a deep maroon colour, is obtained from this dye-stuff. For this purpose, the cloth to be dyed is first soaked in water prepared with myrobalams (*hurra*) and *kasis* (*hirakosh*, or green vitriol), and then dipped into *bakam* water. A dark purple colour is also obtained similarly. The following details of the process of dyeing with *bakam* are extracted from the report received from Cuttack:—"The wood of the *bakam* tree is pounded and denuded of its bark. It is then boiled in the water for two or three hours, and after being allowed to cool, is sometimes mixed with a little lime. The yarn to be dyed is at the same time treated with a solution of alum and turmeric, and dried in the sun. When the yarn is quite dry, it is steeped in the water prepared from the wood, where it is kept some hours, and then taken out and dried. The materials for dyeing one seer of yarn are as follows:—*Bakam* wood, 1 seer 8 chitaks; alum, 2 chitaks; turmeric, 1 chitak; water, 5 seers."

In Muzaffarpur, where an orange colour is obtained from the bark, the material to be coloured is simply dipped into a decoction of *bakam*, obtained by boiling the bark in water.

In Chittagong, the following process is adopted for obtaining a *pucka* (fast) red colour:—"The bark of the *bakam* (called *senhya* in Chittagong) is powdered and boiled with water, and the water strained off into a vessel. This process is repeated three or four times. Then one seer of *jhuri* (*Magi-khre, Jasminum humile*) is mixed with 15 seers of water and boiled. These two liquid preparations are then mixed in equal proportions of 15 seers each, and 5 tolas of cocoanut oil and 5 tolas of alum are added. The mixture is boiled, and some portion of it poured over the cloth, which is in a wooden dish. The cloth is then put into a pot with some of the mixture and

boiled, and turned with a stick until the water has mostly evaporated. It is then taken out lest it should burn, and left to dry in the sun. To make the colour fast and deep, the process described is repeated three or four times."

The cloth to be dyed with *singhar* is immersed in an infusion of this flower, and then dried in the shade. A little acid or alum is sometimes added. The colour produced is known as *basanti*. Various shades of orange and red are produced by the intermixture of *kusum* flower, *singhar* flower, and turmeric. The processes have been already described. For colouring liquor, a small quantity of dried corolla tubes of the flower is tied in a piece of cloth, and kept in the receiver while the distillation of liquor is going on. About half a tola is used in colouring 32 gallons of liquor.

As with *singhar*, the dyeing with *palas* is effected simply by steeping in the infusion obtained by boiling the flowers in water. Alum is sometimes added. The colour produced is a fugitive yellow inclined to red. Dyers use this colour in combination with other dyes, such as *latkan*, *singhar* and turmeric.

When silk is dyed with *latkan*, the process is to mix a *powa* and-a-half of *latkan* seeds with 15 seers of water and half a seer of *sajimati*, and to boil the whole with the silk to be dyed. The result is a yellow colour. Cotton may be dyed in the same way. In Nadia, the colour is made fast by the following process :—"The bark of the *babul* is pounded and boiled with water in an earthen pot. If cotton cloth is to be dyed, the cloth is steeped in the decoction thus prepared and kept for 24 hours. After drying it in the sun, it is steeped and kept for 12 hours in *latkan* solution obtained by boiling *latkan* seeds in water. The cloth is again dried in the shade, and then steeped for 6 hours in *babul* water. It is dried again, and then washed with pure water." This gives a fast orange colour. Silk is dyed in Nadia in the same way, with the following variation in the time for steeping :—"3 hours in *babul* water, 4 hours in *latkan* water, 3 hours again in *babul* water, and 18 hours in alum water."

The process of dyeing with *kamala* at Burdwan is as follows :—"*Sajimati* is dissolved in water, strained and then boiled. As the boiling goes on, the *kamala* powder is thrown into the liquid, boiled, and afterwards alum is added. When the mixture has been boiled for some time, the cloth to be dyed is dipped into the hot liquid and allowed to remain in it for some time till the proper yellow colour is obtained. The cloth is then washed and dried."

The process of dyeing with *al*, as followed in Patna and generally in other districts where the *al* dye is used, is rather elaborate, and produces a fast red colour, which does not go off by repeated washes. It is thus described :—"The cloth to be dyed is first given to the washerman to clean thoroughly. It is then steeped in water mixed with *hurra* (*Terminalia chebula*), and the cloth is then dried. This is done to fix the colour on the cloth. For a piece of five yards, it will be necessary to use two pice weight of the *hurra*. The cloth is then dipped into a mixture prepared of four parts of turmeric, four parts of *lodh* (*Symplocos racemosa*), and one part of alum. It is then again washed and dried. Pieces of *al* wood are well powdered, and about a quarter or one-third of a seer of the powder is boiled for three or four hours with six seers of water. About a chitak of *dhao* flower (*Woodfordia floribunda*) is also put into it. The cloth to be dyed, which has been bleached, as previously described, remains dipped in it for all the three or four hours, and thoroughly absorbs the red colour of the *al*."

The dust obtained from the sawings of *jak* wood is used by dyers for getting a *basanti* or yellow colour. It is generally used for silks. Ordinarily, cloth is coloured by simply steeping it in a solution obtained by boiling sawdust of *jak* wood in water. The silk-dyers of Murshidabad use the following process :—"Sawdust of *jak* wood is mixed with the leaves of the *bakas* plant (*Justicia adhatoda*), and then boiled in water. The decoction is then strained, and the cloth to be coloured is then immersed in the water thus obtained, when a yellow colour is produced." From Chittagong the following interesting account has been received :—"The following process is used by Buddhist priests (Funghi) or by their disciples in dyeing the yellow robes worn by them. The heart of an old *jak* tree is immersed in cool water for two or three days, and then boiled in a brass pot with some alum. When the colour is sufficiently deep, the water is poured into a vessel; more is poured into the vessel containing the wood, and more colour extracted. The cloth to be dyed is placed in a wooden dish, and kept soaked with the dye for two or three days. It is then dried in the sun. The process is repeated from three to six times to the satisfaction of the Funghi."

The only districts from which information has been received of the *toon* dye are Shahabad and Muzaffarpur. The *toon* plant is, however, found in various districts of Bengal; and its flowers, which are generally collected and sold by the poorer classes, are used for producing a yellow colour. The following description of the processes of extraction and dyeing has been obtained from Muzaffarpur :—"One seer of *toon* flowers are boiled in two seers of water and kept on the fire until the quantity of the mixture is reduced to one seer. The liquid is then strained, and the cloth to be coloured is immersed in it, and then dried in the shade." The colour obtained is fugitive.

MORDANTS AND AUXILIARIES.

In addition to the dyes mentioned in previous paragraphs, there are several substances which are for the most part employed as mordants—*e.g.*, *lodh* (*Symplocos racemosa*), *haritaki* or *hurra* (*Terminalia chebula*), *dhaiphul* (*Woodfordia floribunda*), *babul* (*Acacia arabica*), *chakunda* (*Cassia tora*), *amla* (*Phyllanthus emblica*). Along with the above may be mentioned the following ingredients :—Alum, gum arabic, lime, *kasis* (protosulphate of iron), *sajimati* (an alkaline earth). The bark and leaves of the *lodh* tree, which grows wild in the jungle, are used in dyeing. *Lodh* yields a principal dye; but as it is chiefly used as a mordant, it is mentioned here. *Lodh* bark by itself yields a yellow dye, but no mention has been made of this in the reports received now, which show that it is chiefly used as an auxiliary to lac, *kamala*, and *al*. The way in which it is used with lac and *al* has already been described. With *kamala* it gives a fast yellow colour. The process employed in getting the colour is thus described in the Patna report :—"Quarter seer of *lodh*, half a seer of *sajimati*, and 1 chitak of molasses are well mixed with 10 seers of water, and then put on the fire for about three hours. The mixture is then taken

down from the fire, and the thread to be dyed is then put into it and pressed hard with some heavy substance for about half an hour. The thread is then taken out and well wrung. *Kamala* powder is then well rubbed over it. The thread is again dipped into the mixture previously obtained and again put on the fire. It then acquires a fast yellow colour." It is stated also in the Patna report, that a fresh green colour is obtained from the thread dyed yellow as above, by dipping into an indigo solution and then into a solution obtained by mixing turmeric, *hurra*, alum and water.

The fruit of the *haritaki* plant is used in dyeing. It will already have been seen that it is largely employed as an auxiliary with various dye-stuffs. It is also used extensively for producing black dyes in combination with protosulphate of iron. Interesting accounts have been received from the Sonthal Parganas, Manbhum and Singhbhum of the processes employed in obtaining these black colours, which are now reproduced.

In the Sonthal Parganas, waist bands and beaded strings are made from *tasar* thread, which is dyed black with *haritaki*. For this purpose, ripe and unripe *haritaki* berries are taken and well ground, and then mixed with water. The *tasar* thread is dipped into the mixture, and allowed to remain for 12 hours. It is then taken out and dried, and finally placed in black clay (*pankh*) for 12 hours. This process is sometimes repeated twice to obtain a black colour.

In Manbhum, the materials usually employed to dye black are *haritaki*, boiled rice, iron, and *hirakosh* (protosulphate of iron). The process is as follows :—"The fruit of the *haritaki* is ground to a fine powder. It is then mixed with water and allowed to stand for some time. The water is then poured off, leaving the solid matter behind. The thread to be dyed is dipped into this water and then dried. This is repeated three times. The thread is then ready for dyeing, and the dye is prepared as follows :—A quantity of boiled rice is mixed with water and allowed to stand two or three days. The water is then poured off, and to it a quantity of clear water added. Into this are put a piece of iron, and the refuse of iron collected from a blacksmith's anvil, and the whole is allowed to stand for six or seven days. *Hirakosh* is then added, and the thread to be dyed dipped into this mixture two or three times."

In Singhbhum, the substance to be dyed is put into a mixture of *haritaki*, iron dust, *hirakosh*, and Malacca bean (*Semicarpus Sp.*).

In Chittagong, a fast black dye is prepared from the powdered bark of the *gatia* shrub, which is probably a *Terminalia*. The powder is mixed with water and boiled. The water is then strained off and fresh water is added, and the boiling is commenced again. After three boilings, alum is added to the separated water, and the mixture is then poured over the cloth, which is kept moistened in a wooden dish. The mixture is rubbed in well with the hands and dried in the sun. The process is repeated four or five times until a fast black colour is obtained.

The *babul* is a familiar tree in many parts of Bengal. The bark of this plant is used for dyeing to some extent, but the principal use to which it is put is that of tanning leather. In the report received from Monghyr, it is stated that *babul* bark, when boiled, dyes cloth of a *khaki* colour. It is made fast by throwing in a little mustard oil into the boiling water. A pale yellow colour is obtained from *babul* bark in the following manner :—"A *babul* solution being made by boiling in water, the cloth to be dyed is steeped in it, and dried. It is then immersed for eight hours in a decoction made from pomegranate (*anar*) rind, *singhar phul*, alum, and goat's milk, boiled together with water on a cowdung fire."

PRINTING-STUFFS AND PROCESSES EMPLOYED IN PRINTING.

The colour obtained from *al*, as already stated, is used extensively in stamping cloths in different fancy patterns. The cloths are stamped with moulds of different patterns engraved in wood. The process described in the Patna report is that substantially adopted by most calico printers, and is therefore reproduced here in full :—

"A paste is prepared of about 1 seer of resin, $\frac{1}{4}$ seer of alum, $\frac{1}{8}$ seer of *lodh* and turmeric, well powdered and mixed with 4 seers of water. The paste is well rubbed with the hands, and then it is strained through a thin cloth. The ink thus obtained is used for stamping. After the cloth has been stamped, it is washed and dried. The cloth is then soaked in *al* water prepared as described above and boiled. The portions of the cloth covered with the stamps absorb the *al* colour, while the portions not so covered do not take the colour. This gives a beautiful red colouring to the cloth."

A reddish-black is also obtained thus :—"Half-a-seer of molasses, 1 chitak of well-powdered iron, and 1 chitak of *kasis* (protosulphate of iron) are fermented with 10 or 12 seers of water for 10 or 12 days. After the ferment is complete, the mixture is strained through a cloth, with the addition of resin and a small quantity of *ghi*. This gives the paste to be used for stamping. After the stamping is done, the cloth is washed and dried, and then soaked in *al* water, as described above."

It will be interesting here to add the following account of the process of stamping silk cloth, as practised in Serampore in the Hooghly district :—

"*Dhaiful* (*Woodfordia floribunda*), which is a red flower, is mixed with alum, *sofada*, *haridra*, gum arabic, and sugar of lead, and then water being added to them, a cream colour is produced. Then additional water mixed with gum is put in wooden boxes of about 3 feet in length and $1\frac{1}{2}$ feet in breadth. Over these boxes, filled with gum water, wooden frames, with oilcloth at the bottom, are placed, and over the oilcloth a blanket. On this blanket, the coloured liquid produced from the articles noted above is applied and brushed. Ultimately, the wood-cut patterns of various kinds tinged with this colour are pressed on the silk cloth spread on a table. The cloths thus dyed are then washed with water, and afterwards they are boiled in hot water with *manjista* (*Rubia cordifolia*), and the result is a beautiful cream or almond-coloured (*badami*) stamped cloth."

Mr. Collin states, in his Report on the Industries of Bengal, that madder (*Rubia tinctoria*), cochineal (*Coccus cacti*), and turmeric are used in the silk-printing firms of Serampore, and that their dyes are fixed by the use of alum and sulphate of iron (*kasis*). The stamps for printing are carved out of tamarind wood by artists in Barrackpore, and show great skill.

From Gaya, it is reported that the *Chapgars* also use silver and gold, which they fix to the cloth by the gum prepared from *babul* wood. This tinsel painting is also largely done in Calcutta. Gold foil is generally applied on a violet ground, and silver on red.

The patterns used in printing are chiefly floral or geometrical.

THE COTTON FABRIC INDUSTRY OF THE MADRAS PRESIDENCY.

By Mr. EDGAR THURSTON, Superintendent, Madras Government Museum.

Two admirable articles entitled "The Industries of Madras" and "The Printed Cotton Industry of India," by Mr. E. B. Havell, formerly Superintendent of the Madras, now of the Calcutta School of Arts, have, within the last few years, been published in the *Journal of Indian Art* (1888 and 1890). In these articles repeated reference is made to the decline of the indigenous cotton fabric industry, and the degree to which it has suffered from European competition. The scope of the series of monographs, to which I have been invited to contribute, being industrial rather than artistic, it is my duty, with a practical outcome in view, to emphasise and draw more prominent attention to this industrial decline, and the influences which have been at work to produce it.

When, as at the present day, the bazaars of Southern India are flooded with imported piece-goods of British manufacture (which, in conjunction with mineral dyes, must be the key-note to the present monograph), it is curious to look back and reflect that the term piece-goods was originally applied in trade to the Indian cotton fabrics exported to England. "In 1700," Sir George Birdwood writes in his *Industrial Arts of India*, "a law was passed, by which all wrought silks, mixed stuffs and figured calicoes, the manufacture of Persia, China, or the East Indies, were forbidden to be worn or otherwise used in Great Britain. It was particularly designed for the protection of the Spitalfields silk manufacture, but proved of little or no avail against the prodigious importation and tempting cheapness of Indian piece-goods at that time. . . . . Cotton was first manufactured in Scotland in 1676, and in Glasgow in 1738, and in Manchester the manufacture of printed calicoes was regularly established in 1765."

Exactly a century ago (1796-97) the value of piece-goods from India imported into England was £2,776,682, or one-third of the whole value of the imports from India, while the closing years of the present century find the indigenous cotton fabric industry of Southern India strangled by the octopus-like grasp of the enterprising and far-reaching British capitalist, whose influence is manifest even in remote up-country bazaars. The exports have shrunk into trifling insignificance, while the imports of piece-goods (cotton and linen) to the ports of Madras have, as shown by the subjoined statement, assumed vast proportions :—

1886	Rs20,523,956	1895	Rs19,459,073

The nature of the cotton and linen piece-goods imported will be intelligible, to those familiar with the commercial terms, from the following extract from the "Statement of Imports to the Ports of Madras," during the month of March, 1895 :—

Great Britain.	Chintz	Rs422,966	Turkey-red cambrics ...	Rs105,115	Great Britain.
	Grey shirting	792,871	" shirting ...	76,724	
	" madapollam	8,509	" mull	27,672	
	" drill	31,821	" coloured dresses	63,717	
	" jaconets	163,590	" printed scarfs...	36,246	
	" mull	127,561	Grey dhovettees	591,998	
	White jaconets	341,669	White "	25,190	
	" shirting	92,691	Handkerchiefs	9,004	
	" cambrics	77,773	Canvas	6,903	
	" mull	178,221	Linen piece-goods... ...	3,281	
	Book muslin	3,936	Piece-goods, other sorts ...	2,894	
	Coloured muslin	33,818			
Calcutta ...	Piece-goods, grey	2,675	Piece-goods, white... ...	8,363	Bombay.
	" white ...	26,599	" coloured ...	16,600	
	" coloured ...	9,054	" grey ...	18,652	
	Total ...		Rs. 3,327,223.		

It is worthy of note that, while the imports of cotton piece-goods to the ports of Madras during the year 1895 were valued at Rs. 19,459,073 with a monthly average of Rs. 1,621,589, the exports thereof were valued at only Rs. 3,646,946 with a monthly average of Rs. 303,912. The value of the imports, in fact, exceeded that of the exports by the large sum of Rs. 15,812,127. The imports included very large consignments of Turkey-red fabrics (cambrics, shirtings, chintz, jaconets, mull, dresses, and printed scarfs) valued at Rs. 2,387,166, Turkey-red twist valued at Rs. 3,544,554, and other coloured twist valued at Rs. 1,883,232. Turkey-red (a mineral dye), which is largely responsible for the decline in the use of the beautiful vegetable red dyes in the dyeing of cotton fabrics,

appears on the scene, so far as I can ascertain, for the first time in the official trade statement for 1866-67. The exports to Great Britain in 1895 included Madras handkerchiefs (which are repeatedly referred to in "Uncle Tom's Cabin") to the value of Rs.306,305, and Ventupallam handkerchiefs to the value of Rs.2,200. Emigration of natives takes place from Southern India to Natal, Mauritius, the Straits Settlements, Ceylon and Burma, and there is a consequent export to these countries of cotton fabrics adapted to the fashion and requirements of the emigrants, who, in their voluntary exile from home, welcome the familiar Madras handkerchief, dhovettee, &c. The yarn used at the present day in the manufacture of good Madras handkerchiefs is dyed with seruver (*Oldenlandia umbellata*—chay-root or Indian madder) or with Turkey-red and surul-pattai (*Ventilago Madaraspatana*); and I am told that these handkerchiefs fetch a considerably higher price in the foreign market when made with country-dyed yarn than with yarn dyed in Europe, because they are exported for sale to Madras natives working in British colonies, who prefer the original vegetable colour to the modern hybrid imitation.

Very intimately connected with the cotton fabric industry of Southern India at the present day is the employment of aniline and alizarine dyes, the imports of which have, as shown in the following statement, rapidly increased in value from only Rs.20,868 in 1886 to Rs.306,649 in 1895:—

ANILINE AND ALIZARINE DYES.—Imports to the ports of Madras from Great Britain, Hamburg, Antwerp, France, Trieste, Bombay and Calcutta:—

1886	Rs20,868	1895	Rs.306,649

In his "Review of the Trade of India," 1895-96, Mr. J. E. O'Conor states that the dyes imported into India "are mainly alizarine, of which 5,072,101 lbs. were imported, little more than half that quantity (2,693,272 lbs.) being aniline. The dyes are mostly of continental origin, as will be seen from the principal sources of supply noted below; indeed, it is not certain that even the small proportion received from the United Kingdom is not continental:—

	1885-1896.		1885-1896.
United Kingdom	487,588 lbs.	Germany	584,070 lbs.
Belgium	4,581,441 „	Holland	1,151,225 „
Austria-Hungary	616,827 „	Italy	336,493 „

"The total value of all the dyeing and tanning materials imported was Rs.858,893, alizarine and aniline dyes being represented in that sum by Rs.703,900, being about 82 per cent. of the whole."

I learn further from the "Annual Statement of Trade and Navigation, Bombay Presidency," 1895-96, that "the bulk of aniline and alizarine dyes is shipped from Belgium (Antwerp), but Holland (Amsterdam) now has a very large share of the alizarine trade. In both cases the goods are mostly of German manufacture. There has been a brisk demand for these dyes for dyeing silk and cotton goods, and new markets, both in and out of India, are being opened up, while low prices have ruled. Alizarine is now largely imported in lumps, and the better classes of aniline are growing in favour. It is said that numerous new companies are starting in Germany, so that still lower prices and larger imports may be expected."

In explanation of the names aniline, alizarine and Turkey-red, I may quote the following note, which was drawn up for me by a chemical expert: "Turkey-red received its name from the fact that the madder root (*Rubia tinctorum*) was largely grown in, and exported from Turkey and the Levant. The active principle in madder is alizarine, which is obtained from it by a fermentative process somewhat akin to that by which indigo is prepared. After the synthetic production of alizarine from anthracene, the natural source of the dye ceased very largely to be drawn on, and the cultivation of madder is now almost, if not entirely, obsolete. All the Turkey-red dyeing is now done with artificial alizarine; and, in addition, there are dyes of almost every variety of shade, especially blacks, browns, purples, reds, and yellows derived from the same source. By aniline dyes, strictly speaking, are meant only those derived from aniline, and the number of them is very large. But, in a wide sense (a popular one only) it is applied to an enormous number of artificial dyes, derived from a great variety of coal-tar products. There are thousands of them. The chemist refers to them all as synthetic dyes."

As in England, so in Southern India, fashion plays an important rôle in connection with native dress, both male and female. The assumption of the turban by the autochthonous Todas of the Nilgiris; the replacement of the tribal turban of the Badagas by knitted night-cap of bright red or orange hue; the pork-pie cap, beloved of native student, and oft-times ornamented with monstrous knitted flower pattern; the unstarched white shirt, patent leather boots, and white socks of the Bengáli Bábu clerk; the adoption by native cricketers of machine-made coloured blazers, as evil in colour contrast as those of many a house eleven at an English public school, are but a few examples of modern change in native male attire for the worse. Quite recently I was shocked by the appearance of a member of my staff in a new patch-work white shirt adorned with no less than six individual and distinct trade-marks, representing the Prince of Wales, Britannia, an elephant, &c. A native of the labouring classes, when clad in plain white loin cloth stained with indigenous seruver dye, and white or seruver-red turban, is, to my mind, far better dressed than when his turban is dyed with Turkey-red, and the loin-cloth is of white imported fabric with the much-prized trade-mark, or replaced by unseemly pantaloons made of some gaudy imported piece-goods. No longer does the jungle tribesman, who has emerged from his uncivilised condition to work for regular wages on planters' estates, rest content with a simple country-made cloth around his loins, but appears, on high days and holidays, clad in turban or cap and woven coat of English cut. And, on the occasion of a recent visit to the village of a hill-tribe, I found the entire male community dressing in gorgeous apparel for a sacred festival in a neighbouring grove, and painting their faces with sect-marks with the aid of miniature looking-glasses and coal-tar dyes, which, with imported fabrics, are exposed for sale at their weekly market.

Between fashion in female dress in England and Southern India there is this marked difference, that, whereas in England change in form (with the bloomer and bicycle costumes as extreme examples in modern times) is the

most conspicuous feature, in Southern India, while the shape of the *sâri*, jacket and petticoat have remained unaltered, a radical change has taken place in recent years in both design and colour, owing to the wide-spread introduction of imported printed fabrics, which now constitute a conspicuous feature of bazaars throughout the Madras Presidency. Three primary factors are mainly responsible for guiding fashion so far as native female dress in Southern India is concerned, viz., novelty, the quaint or grotesque, and artistic beauty. And the least concerned, in these days of the decline and fall of South Indian industrial arts, is artistic beauty. The love of the grotesque, which prevails among the natives of Southern India, is best illustrated by the carvings on Hindu temples, and by mythological paintings, and is responsible for the demand for the eccentric devices for female dress, with which the bazaars are now stocked, and which are disseminated, through the medium of weekly fairs or markets, to remote places which do not rejoice in the equivalent of milliners' shops.

The value of an average piece of imported British printed cotton fabric will, I am told, run to about nine rupees. Of a particular set of printed fabrics, which are imported into Madras from Manchester or Glasgow, the native merchant, who really commands the situation, may find one pattern which takes on with the natives, and can be disposed of in large quantities for fifteen rupees per piece with a resultant wide margin of profit. But, for some reason, after a successful run, the piece has to be taken off, as the demand for the particular pattern comes to an end in favour of another. The result is that the merchant has stored in his godowns cases of fabrics, which originally sold for fifteen, but for which he cannot get even three rupees. There is, however, a steady demand for a certain number of stock patterns, which have a ready sale at a price which leaves a moderate margin of profit.

In addition to new and showy design, which will captivate the native eye, the ticket or label on each piece is an important element of attraction, and as much ingenuity is displayed in the production of the grotesque on the ticket as on the fabric. And I have before me, as I write, a glazed label depicting a group composed of a native lady with turmeric complexion, clad in a pink *sâri*, seated on a maroon cushion, and engaged in conversation with a naked little boy blue, while a chubby pink child looks on round the corner of a violet *purdah*.

We are now-a-days familiar, through the medium of the papers, with litigation in connection with trade-marks in their commercial aspect. A few months ago an incident occurred, which related to trade-marks in their religious aspect. A public meeting of Muhammadans assembled in the mosque at Ootacamund, with a view to taking steps to present a petition to the Governor to stop the importation of a certain brand of cigarettes made in Germany, as the trade-mark represented a bird of paradise and the *kalima* (the Muhammadan confession of faith) round its neck as being an insult to Muhammadans.

Moochees (designers) are kept constantly employed by piece-goods merchants in devising and painting new patterns for despatch to Europe, which are freely canvassed and criticised with a view to selection or rejection. Those selected are sent to Manchester or Glasgow, and there engraved on copper cylinders, which constitute a very valuable portion of the plant of print-works.

The *raison d'être* of the gaudy eccentricities of device in female apparel, men's shawls, and turbans, which are now endemic in the bazaars of Southern India, is the endeavour on the part of the merchant to secure a fabric which will be attractive and command an extensive sale combined with a large profit. For example, only a few months ago a fabric, intended for making up into female petticoats, arrived in the Madras market, with a pretty flower and bird device on a ground of two shades of red, with a wondrous border composed of an endless procession of white bicycles of ancient pattern with bright green gearing and treadles, separated from each other by upright stems with green and yellow fronds growing out of a conventional border. And the manner in which the bicycles were worked into the design was undoubtedly clever. In another recent importation the same bicycles appear on a cloth with design of flowers and fishes. The whole attraction in these examples, selected out of many patterns which I have inspected while preparing this monograph, lies in the representation of the bicycle, which is fast establishing itself as a "common object of the sea-shore" in Madras.

The native scale of colour, except in so far as it has been perverted by a long course of imported colour-printed fabrics, to which natives have got accustomed, differs from the British colour-scale, as represented by dyers, and mainly in this, that the English colours tend to be crude, while the native colours are of more subdued or compound tints. For example, the beautiful vegetable reds of Madura and Conjeeveram are not what we should call a true red like the imported Turkey-red, but, as can be readily seen in some of the beautiful woven cloths in the industrial section of the Madras Museum, red with a slight admixture of blue.

Writing to me *à propos* of this monograph, one, whose authority in matters industrial I admit, says:—"Let me express a hope that you will not tread the track beaten by writers, who copy each other in abusing mineral dyes. Everything that was said against these dyes in the old days was true, but between the old days and the present day there is a vast difference. Most of the dyes we now import are alizarine, not aniline. They are not crude in colour, and many of them are practically quite fast. The advance made in the manufacture of these dyes is equal to the advance made in chemistry or photography. You might as well abuse the platinotype and carbon print of to-day on the basis of what was said of the primitive daguerreotype, or the silver print which immediately followed it, as abuse the alizarine dyes of to-day on the basis of what was said against the anilines of twenty or thirty, or even ten years ago. Of course, as regards fabrics that may be classed as art fabrics, the use of mineral dyes is not to be encouraged, but I am thinking of the *kapra* (cloth) of the plebs, of which a hundred thousand yards are made to one yard of art fabrics."

I do not, for a moment, contend that the imported printed fabrics which form so conspicuous a feature of the female attire of the middle and lower classes of the native community, should possess the artistic merit, either in colour or design, of the lovely *sâris* manufactured at Adoni, Arni, Kampti, Madura, Tanjore, and other places, or the beautiful satins of Ayyampet, of which fine examples are exhibited in the industrial section of the Madras Museum. But I unhesitatingly condemn both colour and design of many of the imported colour-printed fabrics, which, in a native throng, offend the eye when brought in contrast with the more subdued colouring of the woven

cloths made by native weavers with country-dyed yarn, or imported yarn dyed with mineral dyes in Europe.

The Madura weavers formerly used vegetable dyes of local manufacture far more extensively than at the present day, and Madura was famed for the preparation of a purely vegetable deep-red dye. The preparation of vegetable dyes is now limited to blue and black. The employment of vegetable dyes was abandoned, as it was found to be easier and cheaper to dye with imported mineral dyes, and cheaper to weave cloths with imported than with country-dyed yarn. The old vegetable dyes are superior to the mineral dyes, and, after repeated washings, cloths dyed with vegetable dyes keep their colour better, and last longer. The colour of cloths dyed with the Madura vegetable dye becomes actually brighter after washing instead of fading. The native population of Madura is attracted by the gaudy English printed fabrics, which are sold in the bazaar. For marriage ceremonies some castes will not wear imported fabrics.[1] Even now, in spite of the great influx of these fabrics, there is a large demand for locally-woven and dyed cloths. This is evident to anyone who takes a walk through the Madura bazaar towards sunset, and studies the dress of the native throng, in which locally-woven cloths with prevalence of yellow, and dyed or stained cloths with prevalent red, predominate to a marked degree.

Some years ago barrels of mineral dyes were sent to the Madura dyers by Bombay merchants as a speculation. Experiments were made with these dyes, with a view to ascertaining whether it was possible to obtain with them a colour resembling that produced with vegetable dyes, but at an appreciably cheaper cost. These experiments led to results which from the dyer and merchant's point of view were quite satisfactory. For the last eight or nine years the dyers have, for the production of the deep red colour, which constitutes a conspicuous feature of native dress at Madura, used a mineral moist colour of dark yellow, which they obtain from Bombay in casks. One result of the introduction of this mineral dye has been that the cultivation of various plants, which was formerly carried on solely for the sake of the dyers, has been abandoned. In the preparation of the dye a watery solution of leaves, called *kayam kolli*, is made, and the mineral colour added to it in a fixed proportion. These leaves are derived from a shrub, which grows wild at the foot of Alagar hill, about twelve miles from Madura. Preparatory to dyeing, white yarn or fabric is treated with a mixture of gingelly oil and ashes of the indigo plant, called *jum-jum*, and obtained by setting fire to the plant, and sprinkling salt sand on it while it is ablaze. The yarn or fabric so treated is placed in a copper boiler containing the hybrid dye mixture, which is boiled until the colour has been absorbed to the required degree. The dyers know, as the result of experience, the correct proportion of yarn or cloth to a given quantity of solution. Different shades are obtained by successive re-boilings, *e.g.*, a pale pink cloth, which was shown to me, had been boiled twice, and a cloth of deep red hue five times.

The demand for Madura red cloths, dyed by the old process, in which only vegetable dye was used, is now very slight. But, when specially required on account of their more delicate shades, as compared with dyed cloths turned out by the modern process, they can be made to order. Only those who possess a fine colour sense would order such cloths, as the modern product is such a close imitation of the older vegetable colour. An ordinary woman's cloth produced by the modern process costs only Rs.1-8, whereas, if dyed by the genuine vegetable process, it would cost Rs.2-8 or Rs.3. Even for red cloths of the finest quality, including those interwoven with gold thread for the richer classes, the modern process is resorted to; and, sad to relate, the famous Madura vegetable red dye has practically ceased to exist. Its preparation is, it is true, still understood by existing dyers, old and young; but, unless some unforeseen reversion to abandoned methods occurs, future generations will arise, not only in Madura, but throughout Southern India, to whom the once justly admired vegetable dyes, and the fabrics dyed therewith, will be but a hazy tradition of a bygone age. The spurious imitation of the deep-red colour is certainly, as imitation, very successful, and bears testimony to the skill in technique of the self-taught dyers without recourse to State aid or technical school.

A Kumbakonam weaver is not so well off as his father, who was a weaver, and had not to contend against imported printed fabrics. The weaving industry has declined greatly, in recent years, owing to the importation of these fabrics. He now has only four looms at work instead of eight. Some weavers, who formerly owned looms, are now working as cooly weavers for daily wages. Cloths dyed with mineral dyes look bright and attractive when new, but fade. These dyes are, however, cheap and easy to work with, as no long process of preparation is necessary. Would be glad to see the imports of printed fabrics and mineral dyes abolished, as purchasers come and abuse the bazaar vendors because the colours fade, and some demand their money back on the ground that a bad article has been supplied to them. Madura weavers, who considerably outnumber the Kumbakonam weavers, send red cloths dyed with mineral dyes for sale at Kumbakonam. They are cheap, so natives naturally buy them. The merchants, who sell printed cloths, do not care about quality or good design, so long as they make a good profit. Merchants only buy such cloths as are likely to attract by brightness of colour, and command an extensive sale. Considers that the women of Kumbakonam do not look nearly so well-dressed now as they did before the introduction of imported printed fabrics and cloths dyed with mineral dyes. The price of the vegetable dye-stuff *noonaver*, which was formerly largely cultivated near Kumbakonam, has come down from Rs.14 to Rs.4 per maund, and even at this greatly reduced rate it cannot be used, as its preparation takes several months. Thinks that Government should prohibit the import of printed fabrics and mineral dyes, or tax them very heavily, so that the indigenous industry may be protected. No action short of this will improve the prospects of the weavers. The import of mineral dyes to Persia is, or was prohibited with a view to protecting the carpet industry against degeneration. And the importation of mineral dyes into Kashmir is, I am informed, subject, like that of indigo and other dyes, to the general rate of import duty, Rs.6-10-3 per cent., which, added to our 5 per cent., is a pretty heavy load of taxation.

Ayyampet weavers manufacture cotton, woollen and silk rugs. Vegetable dyes are used in the preparation of the yarn for the woollen and silk rugs, and Europe-dyed yarns for the cotton rugs. Imported dyed yarns look

[1] "The great objection among Hindus to European long-cloth apart from its want of durability is that the coloured and embroidered border of the native cloth is wanting. So, on occasions of ceremony, the native cloth is still used. But, within the last year or two, cloths have been introduced into the market, exactly similar in appearance to the common country-bordered white cloth, and selling at two-thirds the price or less."—HAVELL (*Journal of Indian Art*, 1890).

bright at first, but fade sooner than yarns dyed locally with vegetable dyes. The number of weavers is now very small as compared with former days, and there are only four weaving houses in Ayyampet. The industry has declined owing to the competition of jail-manufactured rugs, which have appreciably interfered with their means of earning a livelihood. They remember the days when the trade in Ayyampet carpets was brisk, when they always had a reserve stock in hand, and made carpets 30 ft. by 20 ft. or 20 ft. by 10 ft. A cotton rug with parallel stripes of mineral red, yellow and green, and indigo blue, and another with wide areas of red, blue and white parallel stripes, interrupted with narrow areas with blue and white pattern, possessed no artistic merit, and were not nearly so good in colour and design as the woollen and silk rugs which were brought to me for inspection.

Bhavâni weavers manufacture cotton rugs on vertical and horizontal looms, of which the former have been recently introduced. Rugs woven on the vertical looms are the most expensive, as they are thicker, and the texture is better than that of the rugs woven on the horizontal looms of ancient pattern. They, moreover, require more skilled labour in their manufacture. Ordinary rugs with red and black stripes cost Rs.7 if made on a vertical loom, and Rs.5-8 if made on a horizontal loom. For the warp, white yarn, spun at the Coimbatore Spinning Mills, and for the woof imported dyed yarns of various colours are used. Sometimes the weavers purchase yarn of local manufacture at the weekly market and dye it black. Black yarn dyed locally, and imported red yarn, never lose their colour. All the other dyed yarns which they use lose their brilliancy after repeated washing. The rugs are sent to Madras and Trichinopoly, as well as to various places in the Coimbatore district, in which Bhavâni is situated. Some are sold to pilgrims, who come to carry out the bathing ceremonial at the confluence of the Bhavâni and Cauvery rivers. Otherwise, there is not a great demand for the rugs, the manufacture of which is in a declining condition owing to lack of encouragement.

Adoni weavers manufacture cotton rugs and carpets on horizontal looms. The weavers are Muhammadans. They used indigenous vegetable dyes until about 15 years ago. The yarn is either dyed locally with imported mineral dyes, or purchased ready-dyed from Europe. The mineral dyes are durable and brighter than the vegetable colours. The greatest number of looms owned by a single individual is ten. They are not so well off as the last generation, as the number of loom-owners has increased, and the profits have consequently to be shared among a greater number of houses. They have, moreover, to compete against cheap imported carpets, and carpets of jail manufacture with patterns similar to those which they turn out. The carpets are sent for sale to Bombay, Calcutta, Madras, London and other places. Sometimes they receive large orders. The carpet merchants pay for the privilege of selling their goods on the railway platforms at Adoni, Gooty and Guntakal, where they do a good business with natives, who buy the rugs for bedding, and Europeans, who buy them for tent carpets, hold-alls, &c. The pattern of the majority of the rugs and carpets consists, as at Ayyampet, of parallel stripes of various colours. Carpets with diamond-shaped device and other more complicated patterns, which require skilled labour, are also manufactured. The carpets are absurdly cheap. One with parallel stripes, 8 ft. by 3 ft. 10 in., is sold for Rs.2-8. Such a carpet takes a man a working day of ten hours to make, and he is paid six annas. One with diamond pattern, 7 ft. 4 in. by 4 ft., is sold for Rs.3-4, and, after paying the weaver twelve annas and deducting the cost of the material, a profit of about two annas is left.

I learn from recent official records that "acute distress has at the present time arisen among the weaving population of Adoni town. The circumstances of these weavers are peculiar, as they all work on a system of advances from money-lenders and cloth merchants, whose debtors they are. Owing to the sudden rise in grain prices all over India and the threatening state of the season, the cloth merchants in Adoni, finding no market for woven cloths, have been obliged to stop all advances to the weavers who work for them, and the result is that the looms in the town, numbering over 4,000, have suddenly stopped working, and the weavers are without employment, and face to face with starvation." Steps have been taken for the relief of the weavers.

Carpets are exported from Kurnool in very large quantities to Hyderabad, Berar, Nagpur, Agra, Cawnpore, Poona, Jubbulpore, Bombay, Khandesh, Gadak, Dharwar, Hubli, Bangalore, Mysore, Kampti, Madras, Cuddapah, Rajahmundry, and other places in Northern and Central India. At the present time the demand for them has altogether ceased owing to the severe distress that exists. The current prices of carpets in the local market barely cover the cost of the twist used, and leave absolutely no margin for even the cost of labour. Generally, one bundle of carpets containing eight pieces was sold for Rs.8, whereas each bundle does not now fetch more than Rs.4 or Rs.5 at the most; and, owing to this fall in prices, bundles of carpets worth about Rs.20,000 are lying idle in the shops in the town. Besides the looms for carpet-weaving, there are other looms in the town, where different kinds of cloths are woven. The looms afford occupation to Muhammadans, mostly *gosha* females, who cannot do any other work than weaving, and the closing of the looms means loss of occupation and livelihood to a very large number of weavers, reported to be about four thousand.

A scheme for the relief of the weavers has been sanctioned, the carpets selected for manufacture being only such kinds as would find a ready local sale in ordinary times.

Samples of carpets (*patti* and *chedasti*) sent to me for inspection were less elaborate in design than those manufactured at Adoni, the patterns consisting of alternate stripes of blue and white, blue and red, or two shades of blue.

(*To be continued*).

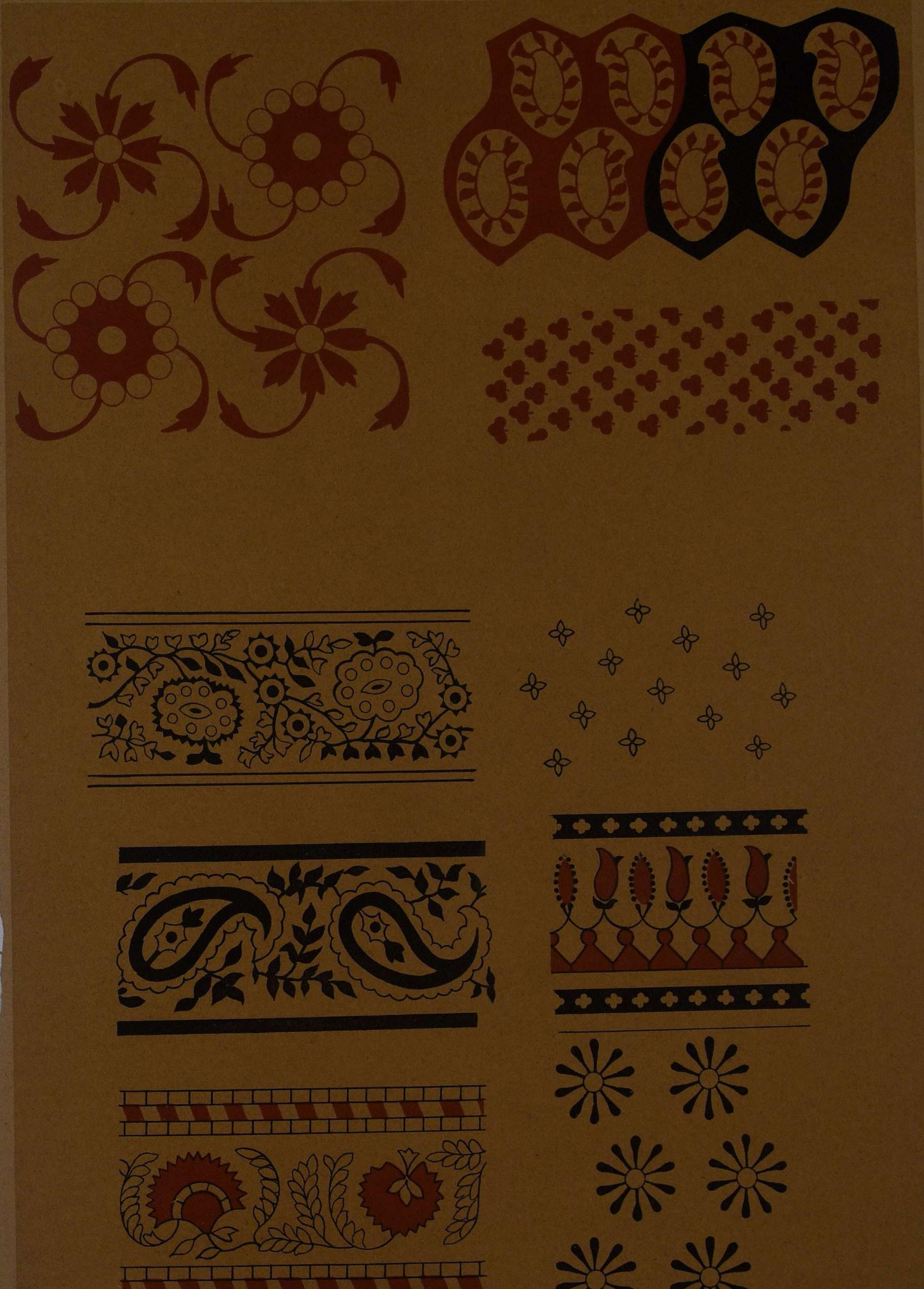
LIST OF ILLUSTRATIONS.

Dyes and Dyeing in Bengal.—76 to 79.—Stamped Patterns. 80.—Dyers and Printer at work. The Cotton Fabric Industry of the Madras Presidency.—81 to 88.—Arcot Wood Blocks.

76.—Stamped Patterns.

77.—Stamped Patterns.

78.—Stamped Patterns.



D PATTERNS.

Dyeing and Dyers at Work.

80.—Printing and Printer at Work.

81.—Arcot Wood Blocks.

82.—Arcot Wood Blocks.

83.—Arcot Wood Blocks.

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88.—Arcot Wood Blocks.

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